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**Physics Department**

**Physics 112**

**Experiment no.3**

**Network Analysis- Superposition Principle and Kirchoff’s Laws**

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**Abstract:**

1. the aim of the experiment is to prove experimentally the superposition principle and kirchhoff’s laws(loop theorem and the junction theorem) in the lab
2. The method used: by connecting complicated circuits and taking it’s element’s values of current and voltage difference and compare it with the values obtained from the analyzing of the networks by using the superposition principle and kirchhoff’s lawsto prove their correctness

 **Data**

**Kirchhoff Rules**

**I1= mA I2= mA I3= mA**

**Superposition Principle**

|  |  |  |  |
| --- | --- | --- | --- |
| **When E2 is Killed** | **I11= mA** | **I12= mA** | **I13= mA** |
| **When E1 is Killed** | **I21= mA** | **I22= mA** | **I23= mA** |
| **Sum /substract** |  |  |  |

**Calculations and the analysis:**

* Using kirchhoff’s law(loop and junction theorem)that are explained in the theory we can obtain these three equations:

 **I1=I2+I3**

**ε1= I1 R1 +I2 R2**

**ε2= I2 R2 +I3 R3**

solving these three linear equations by seting(R1= kΩ ,R2 = kΩ ,R3 = kΩ)

we get: **I1 = mA**

 **I2 = mA**

 **I3 = mA**

* using the SPP:

to find the value of I31 I32 theoretically using the SPP we apply the equations:

 I31 = ε1  R2 /R1R2+R1R3 + R2R3 = mA

 I32 = ε2  R1 /R1R2+R2R3 + R1R3 = mA

 **I3=I31 +I3** = mA

**Conclusion :**